WHAT IS CLAIMED IS:

1. A method of conditioning a composite signal, the composite signal being formed by introducing a first signal into a second signal, comprising:

adaptively filtering the first signal;

detecting the second signal in the composite signal;

controlling filter adaptation of the first signal as a function of the second signal detection; and

recovering the second signal from the composite signal using the adaptively filtered first signal.

2. The method of claim 1 wherein the second signal recovery comprises subtracting the adaptively filtered first signal from the composite signal.

3. The method of claim 1 wherein the second signal recovery comprises delaying the composite signal such that the second signal recovery occurs after the second signal detection.

4. The method of claim 1 wherein the controlling of the filter adaptation comprises selectively disabling the filter adaptation.

5. The method of claim 4 wherein the controlling of the filter adaptation comprises disabling the filter adaptation when the second signal is detected in the composite signal.

6. The method of claim 4 wherein the filter adaptation is disabled by holding adaptation coefficients constant.

7. The method of claim 1 wherein the second signal detection comprises estimating an absolute value of a parameter of the composite signal, estimating a maximum parameter of the first signal, comparing the absolute value of the composite signal parameter to the estimated maximum first signal parameter, and detecting the second signal as a function of the comparison.

8. The method of claim 7 wherein the composite signal includes a plurality of first signal samples comprising first and second sets of the first signal samples, the first set of samples preceding the second set of samples in time, and wherein the maximum parameter estimation

comprises applying a weighting function to each of the samples of the second set, estimating the absolute value of each of the weighted samples, multiplying the absolute values of the weighted samples to estimate a second maximum parameter, comparing the second maximum parameter to a first maximum parameter for the first set of the samples, the maximum estimated parameter being related to a maximum of the first and second maximum parameters.

9. The method of claim 7 further comprising applying a scale factor to the first maximum parameter, the maximum estimated parameter being related to a maximum of the scaled maximum first parameter and a scaled maximum second parameter.

10. The method of claim 1 wherein the second signal detection comprises pre-conditioning the composite signal, the second signal detection being a function of the first signal and the pre-conditioned composite signal.

11. The method of claim 10 wherein pre-conditioning of the composite signal comprises adaptively filtering the first signal a second time and subtracting the second adaptively filtered first signal from the composite signal.

12. A method of canceling a far end echo from a near end signal, comprising:
adaptively filtering a far end signal;
detecting whether the near end signal comprises speech;
disabling the filter adaptation when the near end signal comprises speech; and
canceling the far end echo from the near end signal using the adaptively filtered far end signal.

13. The method of claim 12 wherein the echo cancellation comprises subtracting the adaptively filtered far end signal from the near end signal.

14. The method of claim 12 wherein the echo cancellation comprises delaying the near end signal such that the echo cancellation occurs after the detection of the near end signal with speech.

15. The method of claim 12 wherein the filter adaptation is disabled by holding adaptation coefficients constant.

16. The method of claim 12 wherein the detection of the near end signal with speech comprises estimating an absolute value of a parameter of the near end signal, estimating a maximum parameter of the far end signal, comparing the absolute value of the near end signal parameter to the estimated maximum far end signal parameter, and detecting whether the near end signal comprises speech as a function of the comparison.

17. The method of claim 16 wherein the near end signal includes a plurality of first near end signal samples comprising first and second sets of the near end signal samples, the first set of samples preceding the second set of samples in time, and wherein the maximum parameter estimation comprises applying a weighting function to each of the samples of the second set, estimating the absolute value of each of the weighted samples, multiplying the absolute values of the weighted samples to estimate a second maximum parameter, comparing the second maximum parameter to a first maximum parameter for the first set of the samples, the maximum estimated parameter being related to a maximum of the first and second maximum parameters.

18. The method of claim 16 further comprising applying a scale factor to the first maximum parameter, the maximum estimated parameter being related to a maximum of the scaled maximum first parameter and a scaled maximum second parameter.

19. The method of claim 12 wherein the detection of the near end signal with speech comprising pre-conditioning the near end signal, the detection of the near end signal with speech being a function of the far end signal and the pre-conditioned near end signal.

20. The method of claim 20 wherein pre-conditioning of the near end signal comprises adaptively filtering the far end signal a second time and subtracting the second adaptively filtered far end signal from the near end signal.

21. A signal conditioner for conditioning a composite signal, the composite signal being formed by introducing a first signal into a second signal, the signal conditioner comprising:

an adaptive filter to filter the first signal;

logic to detect the second signal in the composite signal, the logic controlling the adaptation of the filter as a function of the second signal detection; and

a difference operator to subtract the filtered first signal from the composite signal to recover the second signal.

22. The signal conditioner of claim 21 further comprising a delay circuit in a path of the composite signal coupled to the difference operator, the composite signal being coupled to the logic before the delay circuit.

23. The signal conditioner of claim 22 wherein the delay circuit comprises a filter.

24. The signal conditioner of claim 22 wherein the delay circuit comprises a decimator.

25. The signal conditioner of claim 22 wherein the delay circuit comprises a buffer.

26. The signal conditioner of claim 22 wherein the logic controls the adaptation of the filter by selectively disabling the filter adaptation.

27. The signal conditioner of claim 26 wherein the logic controls the adaptation of the filter by disabling the filter adaptation when the second signal is detected in the composite signal.

28. The signal conditioner of claim 26 wherein the adaptive filter comprises adaption coefficients, and the logic disables the adaptation of the filter by holding the adaptation coefficients constant.

29. The signal conditioner of claim 22 further comprising a first estimator to estimate an absolute value of a parameter of the composite signal, and a second estimator to estimate a parameter of the first signal, wherein the logic compares the absolute value of the composite signal parameter to an estimated maximum of the first signal parameter and detects the second signal as a function of the comparison.

30. The signal conditioner of claim 29 wherein the composite signal includes a plurality of first signal samples comprising first and second sets of the first signal samples, the first set of samples preceding the second set of samples in time, and wherein the logic estimates the maximum first signal parameter by applying a weighting function to each of the samples of the second set, estimating the absolute value of each of the weighted samples, multiplying the absolute values of the weighted samples to estimate a second maximum parameter, selecting a

maximum between the second maximum parameter and a first maximum parameter for the first set of the samples, the maximum estimated parameter being related to the selection.

31. The signal conditioner of claim 29 wherein the logic further applies a scale factor to the first maximum parameter, the maximum estimated parameter being related to a maximum of the scaled maximum first parameter and a scaled maximum second parameter.

32. The signal conditioner of claim 22 further comprising a second adaptive filter to filter the first signal a second time, and a subtractor to subtract the second filtered first signal from the composite signal to generate a pre-conditioned composite signal, the logic detecting the second signal in the composite signal as a function of the pre-conditioned composite signal.

33. An echo canceller to cancel a far end echo from a near end signal, comprising:

an adaptive filter to filter a far end signal;

logic to detect whether the near end signal comprises speech, the logic disabling the adaptation of the filter when the near end signal comprises speech; and

a difference operator to cancel the far end echo from the near end signal using the adaptively filtered far end signal.

34. The echo canceller of claim 33 further comprising a delay circuit in a path of the near end signal coupled to the difference operator, the near end signal being coupled to the logic before the delay circuit.

35. The echo canceller of claim 34 wherein the delay circuit comprises a filter.

36. The echo canceller of claim 34 wherein the delay circuit comprises a decimator.

37. The echo canceller of claim 34 wherein the delay circuit comprises a buffer.

38. The echo canceller of claim 33 wherein the adaptive filter comprises adaption coefficients, and the logic disables the adaptation of the filter by holding the adaptation coefficients constant.

39. The echo canceller of claim 33 further comprising a first estimator to estimate an absolute value of a parameter of the near end signal, and a second estimator to estimate a parameter of the far end signal, wherein the logic compares the absolute value of the near end signal parameter to an estimated maximum of the far end signal parameter and detects whether the near end signal comprises speech as a function of the comparison.

40. The echo canceller of claim 39 wherein the far end signal includes a plurality of far end signal samples comprising first and second sets of the far end signal samples, the first set of samples preceding the second set of samples in time, and wherein the logic estimates the maximum far end signal parameter by applying a weighting function to each of the samples of the second set, estimating the absolute value of each of the weighted samples, multiplying the absolute values of the weighted samples to estimate a second maximum parameter, and selecting a maximum between the second maximum parameter and a first maximum parameter for the first set of the samples, the maximum estimated parameter being related to the selection.

41. The echo canceller of claim 40 wherein the logic further applies a scale factor to the first maximum parameter, the maximum estimated parameter being related to a maximum of the scaled maximum first parameter and a scaled maximum second parameter.

42. The echo canceller of claim 33 further comprising a second adaptive filter to filter the far end signal a second time, and a subtractor to subtract the second filtered far end signal from the near end signal to generate a pre-conditioned near end signal, the logic detecting speech in the near end signal as a function of the pre-conditioned composite signal.

43. An echo canceller to cancel a far end echo from a near end signal, comprising:

filter means for adaptively filtering a far end signal;

logic means for detecting whether the near end signal comprises speech, the logic means comprising disabling means for disabling the adaptation of the filter means when the near end signal comprises speech; and

canceling means for canceling the far end echo from the near end signal using the adaptively filtered far end signal.

44. The echo canceller of claim 43 further comprising delay means for delaying the near end signal before being applied to the canceling means, the near end signal being coupled to the logic means before the delay means.

45. The echo canceller of claim 44 wherein the delay means comprises a filter.

46. The echo canceller of claim 44 wherein the delay means comprises a decimator.

47. The echo canceller of claim 44 wherein the delay means comprises a buffer.

48. The echo canceller of claim 43 wherein the filter means comprises adaption coefficients, and the disabling means comprises means for holding the adaptation coefficients constant.

49. The echo canceller of claim 43 further comprising means for estimating an absolute value of a parameter of the near end signal, and means for estimating a parameter of the far end signal, wherein the logic means comprises means for comparing the absolute value of the near end signal parameter to an estimated maximum of the far end signal parameter and means for detecting whether the near end signal comprises speech as a function of the comparison.

50. The echo canceller of claim 49 wherein the far end signal includes a plurality of far end signal samples comprising first and second sets of the far end signal samples, the first set of samples preceding the second set of samples in time, and wherein the logic means further comprises means for estimating the maximum far end signal parameter comprising means for applying a weighting function to each of the samples of the second set, means for estimating the absolute value of each of the weighted samples, means for multiplying the absolute values of the weighted samples to estimate a second maximum parameter, and means for selecting a maximum between the second maximum parameter and a first maximum parameter for the first set of the samples, the maximum estimated parameter being related to the selection.

51. The echo canceller of claim 50 wherein the logic means further comprises means for applying a scale factor to the first maximum parameter, the maximum estimated parameter being related to a maximum of the scaled maximum first parameter and a scaled maximum second parameter.

52. The echo canceller of claim 43 further comprising second filter means for adaptively filtering the far end signal a second time, and means for subtracting the second filtered far end signal from the near end signal to generate a pre-conditioned near end signal, the logic means comprising means for detecting speech in the near end signal as a function of the pre-conditioned composite signal.